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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/237,229 01/26/99 KIM

K SEC. 0584

IM62/0103

JONES & VOLENTINE
12200 SUNRISE VALLEY DRIVE
SUITE 150
RESTON VA 20191

EXAMINER

MACARTHUR, S

ART UNIT

PAPER NUMBER

1763

DATE MAILED:

01/03/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/237,229

Applicant(s)

KIM ET AL.

Examiner

Sylvia R MacArthur

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 11/14/00.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☒ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

Art Unit: 1763

DETAILED ACTION

Cancelled Claims

1. Examiner wishes to acknowledge the cancellation of claims 33-68.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1,2, 3, 5, 6, 9, 11,12, 14-25, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Yonemitsu et al (USP 5,788,447)

Yonemitsu discloses a substrate processing apparatus 1 comprising a substrate transfer chamber, a plurality of substrate processing chambers 70 disposed on a first side wall 53 of the substrate transfer chamber 50, and stacked in the vertical direction, a plurality of gate valves 93, each disposed between each of the processing chambers and the substrate transfer chamber.

The substrate processing apparatus is composed of a processing section 700, a transfer section (transfer path) 500, and a front section 100.

There are a plurality of first valves, located between each of the substrate processing chambers and the substrate transfer chamber, and each of the plurality of first valves (gate valves) is capable of providing hermetic vacuum isolation between the processing chambers and

Art Unit: 1763

the transfer chamber, when closed. These valves allow the substrates to pass through when opened, according to col. 3, lines 3-14.

The load lock chamber can be depressurized independent of the substrate transfer chamber. Two load locks are provided one for incoming substrates and the other for outgoing substrates.

The transfer section 500 comprises a transfer module 501, which includes a wafer transfer chamber 50 and a wafer-transfer vacuum robot 60. The front section 100 is composed of a plurality of load-lock modules 300 and an atmospheric pressure section 200. Each load lock module 300 is composed of a wafer accommodating chamber 30, a gate valve 92, and a front door valve. There are disposed cassette shelves 11 for mounting a cassette 10 and a cassette transfer and wafer transfer device 20.

The wafer-transfer vacuum robot 60 is disposed within the wafer transfer chamber 50. The wafer-transfer vacuum robot 60 is an articulated robot and is composed of arms 63, 65, and 67. Each arm is swingable in a corresponding horizontal plane allowing the wafers to be moved in the horizontal direction. The wafer transfer robot 60 can transfer two wafers 5 at one time using the two wafer mounting arms 68, see Figures 5A and 5B.

Cassette shelves 11 are disposed within and attached to the housing 900 and are disposed substantially opposite the wafer transfer chamber 50. A cassette transfer device 21 and wafer transfer device 23 is disposed on bases 25 and 26 and can independently perform parallel displacement. The cassette transfer device 21 has a cassette transfer arm 22 and transfers the cassette 10 which is mounted on a cassette holder 27 attached to end of the cassette transfer arm 22. Note the cassettes are loaded at atmospheric pressure.

Art Unit: 1763

Walls 53 and 54 of the wafer transfer chamber 50 are opposed to each other so as to arrange on a substantially straight line the reaction chamber 70, the wafer transfer chamber 50, and the wafer accommodating chamber 30, and the wafer transfer chamber 50 has a rectangular shape as viewed in Fig.3.

Fig. 11 illustrates a gate valve located away from the transfer path (90).

The cassette transfer and wafer transfer device 20, not the wafer-transfer robot 60 are disposed within the wafer transfer chamber 50, is used for transferring wafers 5 between the wafer accommodating chamber 30 and the cassettes 10.

4. Claims 1,2, and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Yokoyama et al (USP 5,820,679)

Yokoyama discloses a fabricating system including a plurality of processing apparatus connected to each other by an inter-apparatus transporter. Figure 1 illustrates the processing chambers installed in multiple layers. Gate valves are formed between each type of chamber (load/unload/process) some are located on a side of the processing chamber away from the transfer path. The gates are selectively opened and closed to allow passage of the wafers.

5. Claims 1,2, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Ono et al (USP 5,527,390)

Ono discloses a treatment system with a treatment apparatus for performing a predetermined treatment for a planar workpiece contained in a carrier. This system comprises transfer paths 408a, 409. Figure 1 illustrates a plurality of upright type heat treatment apparatuses 10,12, 14, and 16, an I/O station 20, and a transfer path 24. The carrier liner 22

Art Unit: 1763

travels on the transfer path 24. The I/O station 20 has a carrier transfer unit 26 which transfers one or two carriers CR between an external transfer robot (not shown) and the carrier liner 22.

Fig. 18 illustrates a carrier holding mechanism 418, which has a carrier holding portion 419 consisting of two opposed parts. The carrier holding portion 419 has two carriers CR at a time. The holding mechanism carries the wafers in the vertical position.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 26-29, and 30 are rejected under 35 U.S.C. 103(a) as obvious over in Yonemitsu in view of Hiroki (USP 5,306,380).

The teachings of Yonemitsu were discussed above.

Yonemitsu fails to disclose a transfer arm comprising a controller for the transfer robot.

Hiroki discloses a transfer member arranged under the air atmosphere is located to face the second load lock chamber. A retractable arm for transferring a substrate between each of the process chambers and the second load lock chamber is arranged within the first load lock chamber.

A transfer member 6 is arranged outside lock chamber 2. Figure 1 shows the state that cassettes 5a and 5 are disposed on vertically movable tables. The transfer member 6 comprises 15a and 15b superposed one upon the other and a base 16 for rotatably supporting these arms.

Art Unit: 1763

The two arms according to col. 4, lines 2-12 are able to transfer two substrates at a time from cassettes 5a and 5b.

Fig. 3 shows the driving system of base 9. The driving system comprises a cylinder 34, seal 38, bearings 42, and motors 54 and 56. Hiroki discusses the use of the apparatus in col. 6 lines 45-66. Hiroki cites that a computer (controller) can be used to control the movement of arm 7 (having the 3-arm arrangement see Fig. 6A). This arm would be used when the substrate S is moved by arm 7 from the process chambers 3a to the process chamber 3c. The motor and positioner 24 are provided to move or position in the direction desired (vertical, horizontal or otherwise).

The motivation to provide the transfer apparatus of Yonemitsu with a controller is to provide automatic, precise movement of the transfer device to ensure proper alignment of the wafers during loading/unloading and processing.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention, to provide the transfer apparatus of Yonemitsu with a controller.

8. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yonemitsu.

The teachings of Yonemitsu were discussed above.

Yonemitsu fails to teach that the load lock chambers are provided with a vacuum pressure generator.

Vacuum pressure generators such as pumps are art-recognized devices to maintain vacuum conditions in processing and load lock chambers.

Therefore, it would have been obvious at the time of the claimed invention to provide the load lock chambers of Yonemitsu with vacuum pressure generators.

9. Claims 13 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yonemitsu in view of Hiroki (USP 5,306,380) as applied in paragraph in further view of Maydan (USP 4,951, 601).

The teachings of Yonemitsu and Hiroki were discussed above.

Both fail to teach providing the transfer arm with a vacuum line.

Maydan discloses a robot 80 comprising a removable base plate 88, blade assembly 84, and driving mechanisms 100 and 102 which are controlled by a controller/computer see cols. 5 and 6.

Maydan illustrates in Figs. 1 and 3, blade assembly 84 (transfer arm) which includes arm 104 and a replaceable metal blade or end effector 106 mounted thereto which has a circular pocket 108 for receiving a wafer 15 of a given size. Replaceable blades 106 having different sized pockets 108 can be used to hold different sized wafers. Blade 106 has holes 110--110 adjacent the outer end that are connected to a vacuum pump (not shown) by vacuum line 112, which are routed through the hollow inner shaft 98 (FIG. 2). Thus, blade 106 can operate as a vacuum pick, in which case the wafers are picked up at the end of the blade from cassettes 26 and 28 or deposited into the cassettes, in the external atmospheric pressure ambient.

The motivation to provide the transfer device (resulting from the combined teachings of Yonemitsu and Hiroki) with a vacuum line is to decrease the number of particles on the wafer-supporting surface and provide an improved chucking means for the transfer arm, as taught by Maydan.

Art Unit: 1763

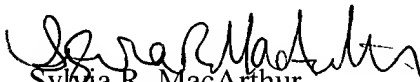
Therefore, it would have been obvious for one of ordinary skill in the art at time of the claimed invention to provide the transfer arms of Yonemitsu and Hiroki with a vacuum line,

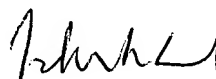
Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R MacArthur whose telephone number is 703-306-5690. The examiner can normally be reached on M-Th 6:30-4:00 1st and 3rd Fri. 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Sylvia R. MacArthur
January 1, 2001



**JEFFRIE R. LUND
PRIMARY EXAMINER**